

09/8/2024

ABSTRACT OF THE DISCLOSURE

An electrically continuous, grounded conformal EMI protective shield and methods for applying same directly to the surfaces of a printed circuit board. The EMI shield adheres and conforms to the surface of the components and printed wiring board. The shield takes the shape of the covered surfaces while adding little to the dimensions of the surfaces. The EMI shield includes low viscosity, high adherence conductive and dielectric coatings each of which can be applied in one or more layers using conventional spray techniques. The conductive coating prevents substantially all electromagnetic emissions generated by the shielded components from emanating beyond the conformal coating. The dielectric coating is initially applied to selected locations of the printed circuit board so as to be interposed between the conductive coating and the printed circuit board, preventing the conductive coating from electrically contacting selected components and printed wiring board regions. A high viscosity, non-electrically-conductive filler material is applied to printed circuit board regions that have surfaces that are cavitational and/or which have a highly variable slope. The filler material can be used in conjunction with conformal EMI shield board level coating. The high viscosity, electrically non-conductive filler material substantially covers each cavity such that the covered cavity is inaccessible and that the covered region of the printed circuit board has a contiguous, contoured surface. A pre-manufactured non-electrically-conductive component cover can be mounted over a corresponding component and secured to the printed wiring board. The component cover and printed wiring board surround the component, forming a sealed enclosure. The component cover has a thin cross-section and an interior surface that follows closely the surface of the component. This minimizes the volume enclosed by the component cover. In addition, the exterior surface of the component cover has a low profile, and prevents the conformal EMI shield from physically contacting the covered component. Instead, the exterior surface of the component cover is coated with the EMI shield. This enables the covered component to be removed from the printed circuit board for repair, replacement or salvage without having to risk damage to the printed wiring board or component that may occur with the removal of a conformal EMI shield applied directly to the component.